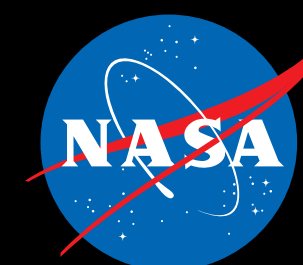


Ammonia in Jupiter's troposphere from high-resolution 5-micron spectroscopy

Rohini Giles¹, Leigh Fletcher², Pat Irwin¹, Glenn Orton¹, James Sinclair¹

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Jet Propulsion Laboratory
California Institute of Technology

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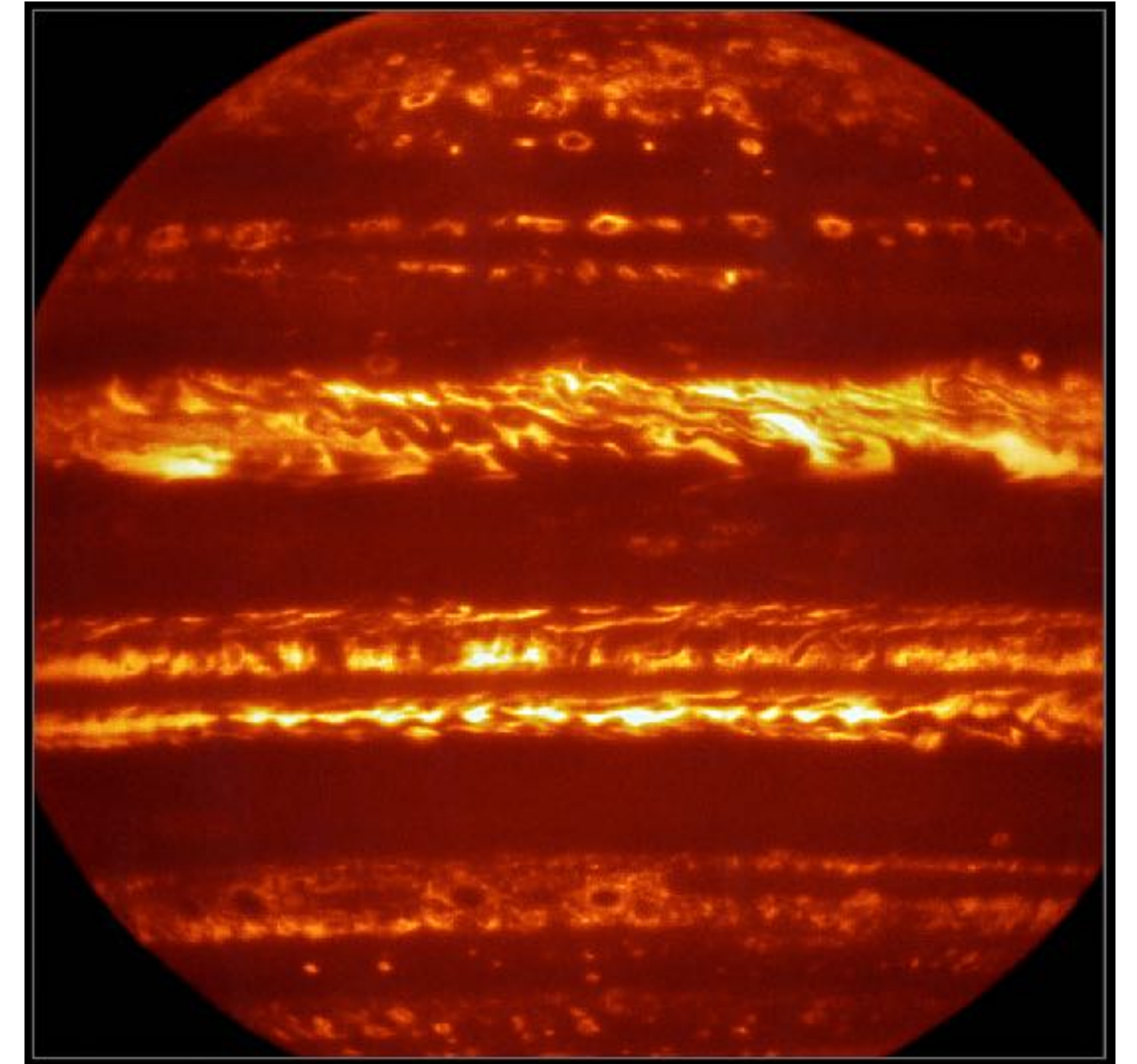
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Ammonia in Jupiter's atmosphere

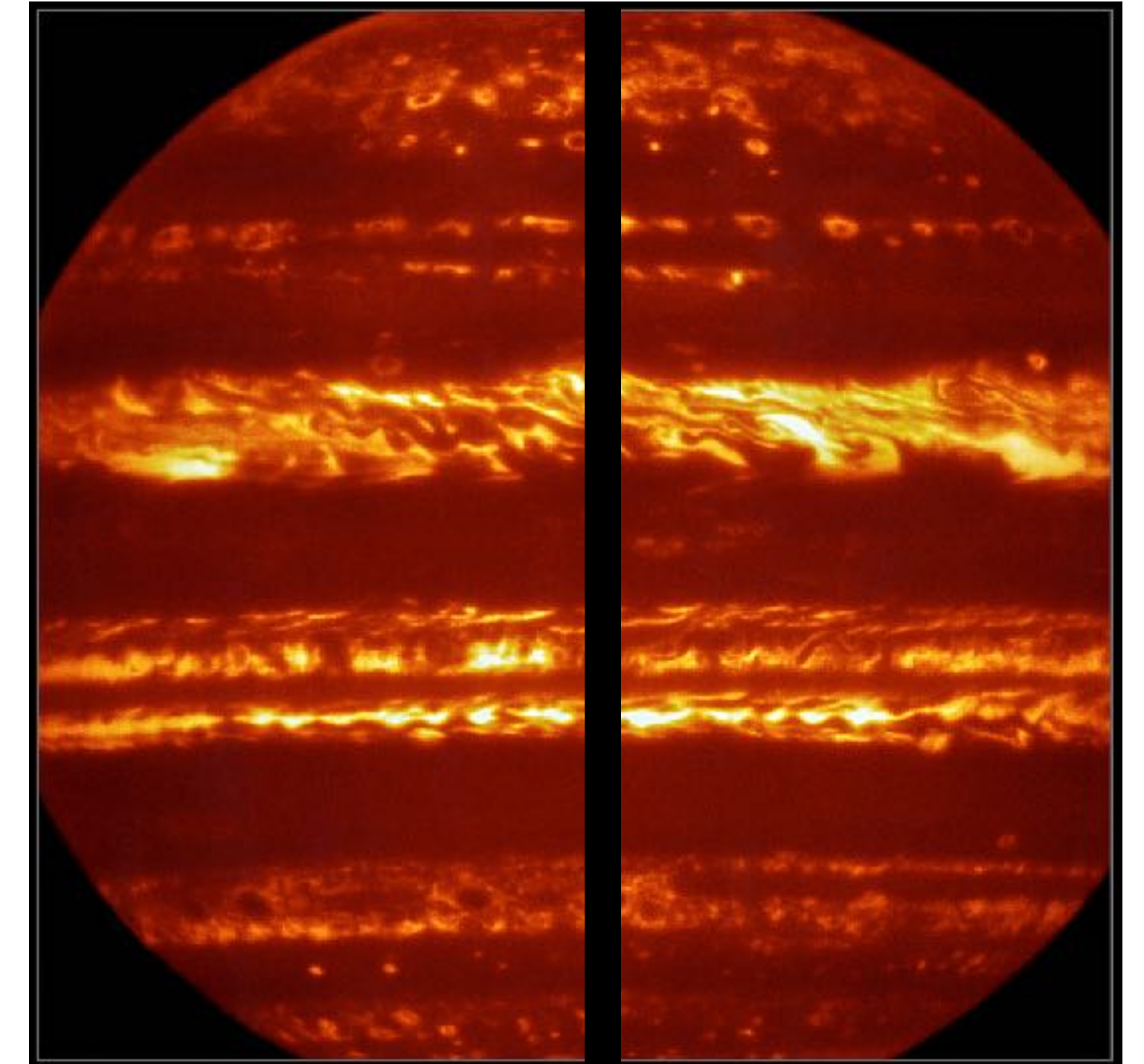
- NH_3 plays important role in Jupiter's meteorology → condenses to form clouds, traces atmospheric dynamics
- 5- μm atmospheric window gives access to 1-4 bar range in Jupiter's troposphere
- VLT/CRIRES instrument used to observe NH_3 absorption lines at 5- μm , with $R=96,000$
- Slit aligned north-south along central meridian, allowing us to look at latitudinal variability



Jupiter at 5- μm

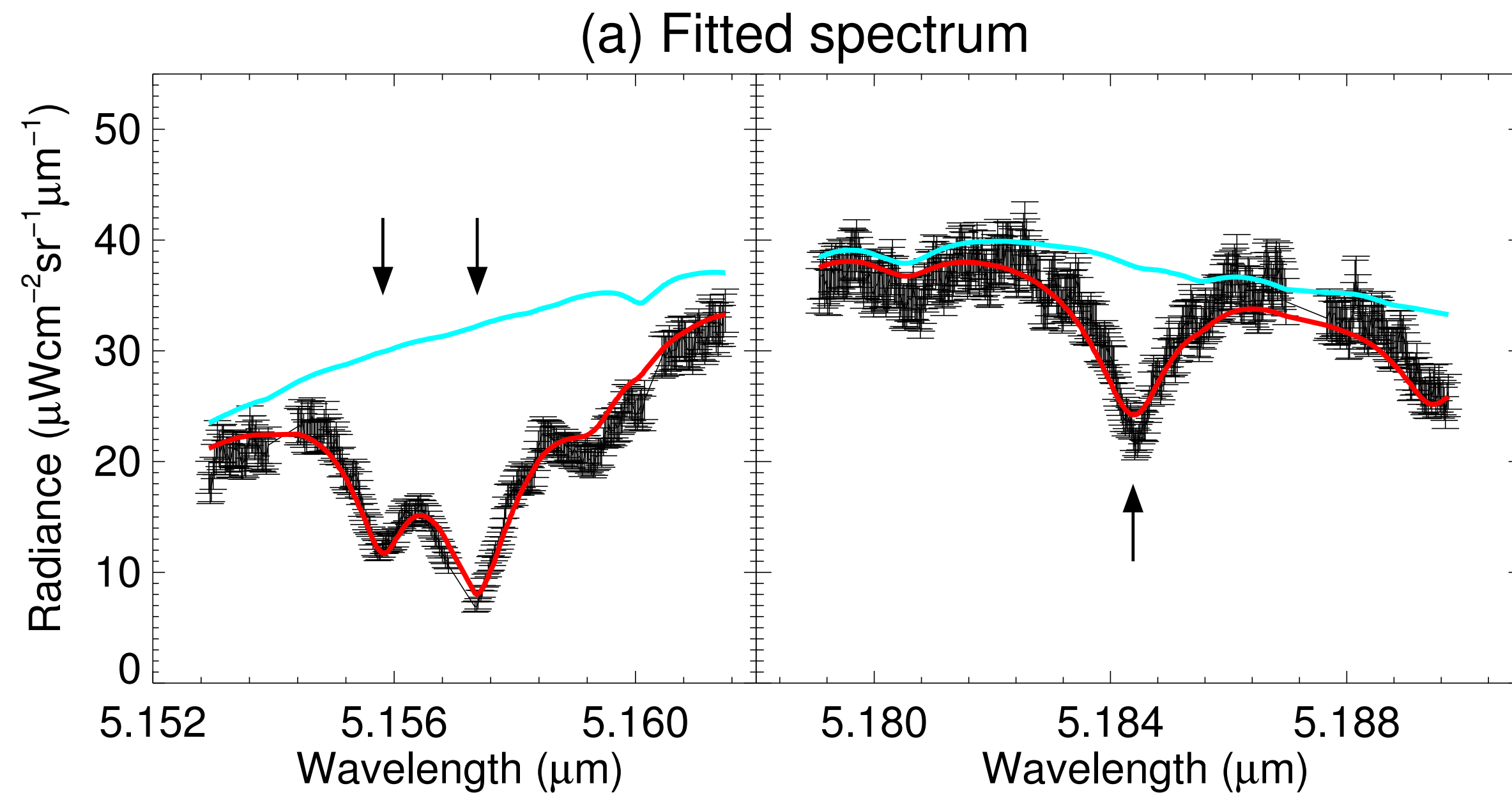
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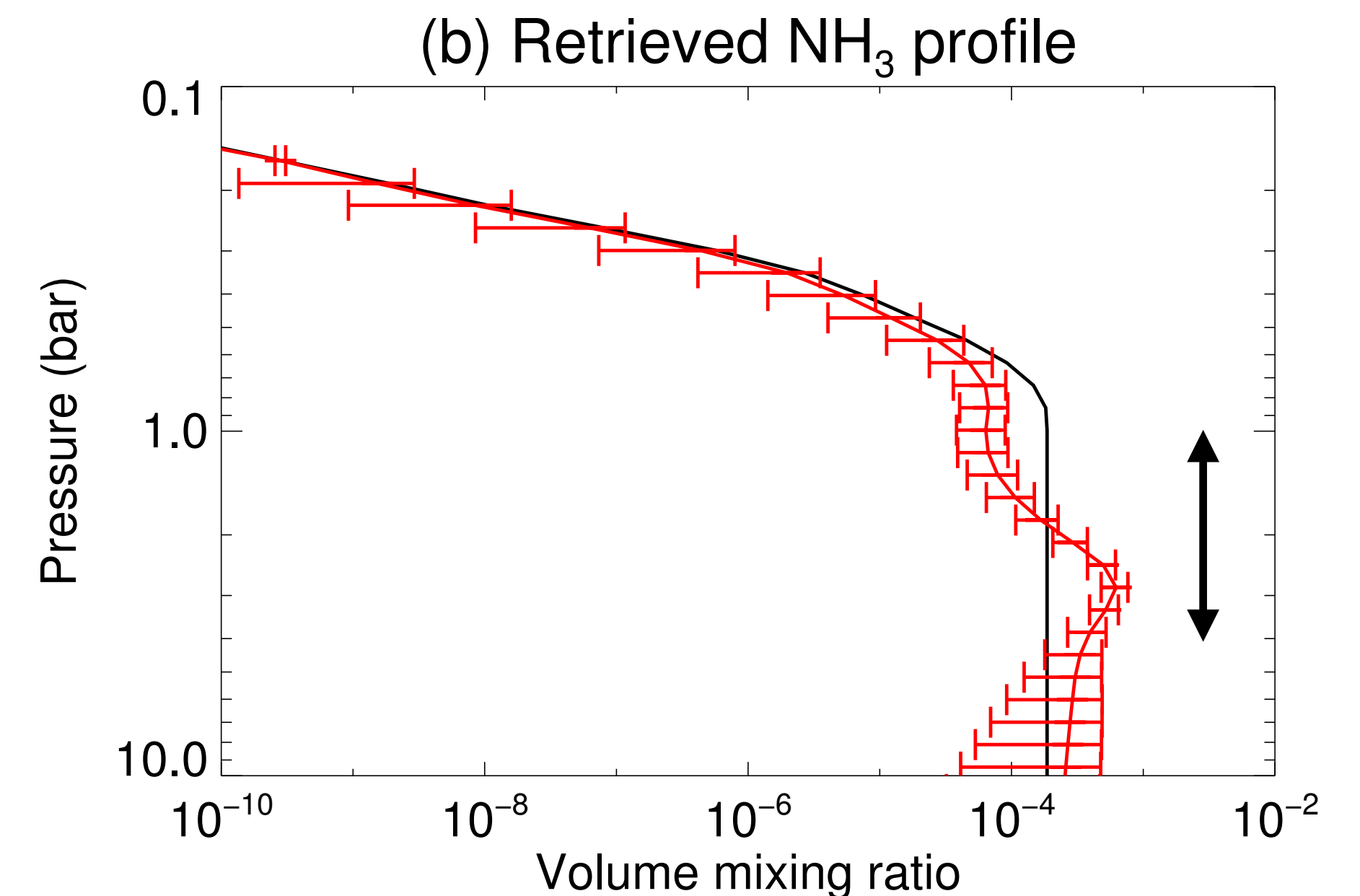
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CRIRES observations

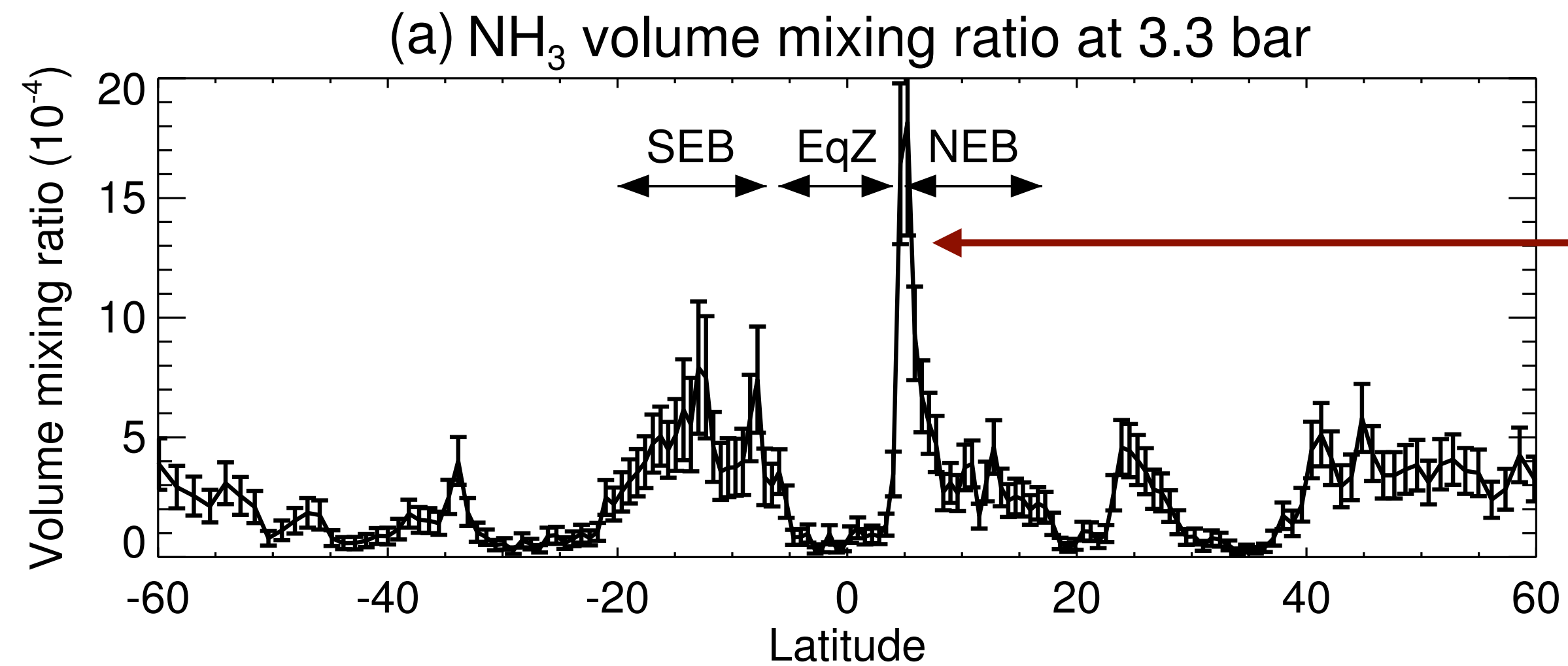


- NH_3 absorption lines have varying strength \rightarrow together probe 1-4 bar range

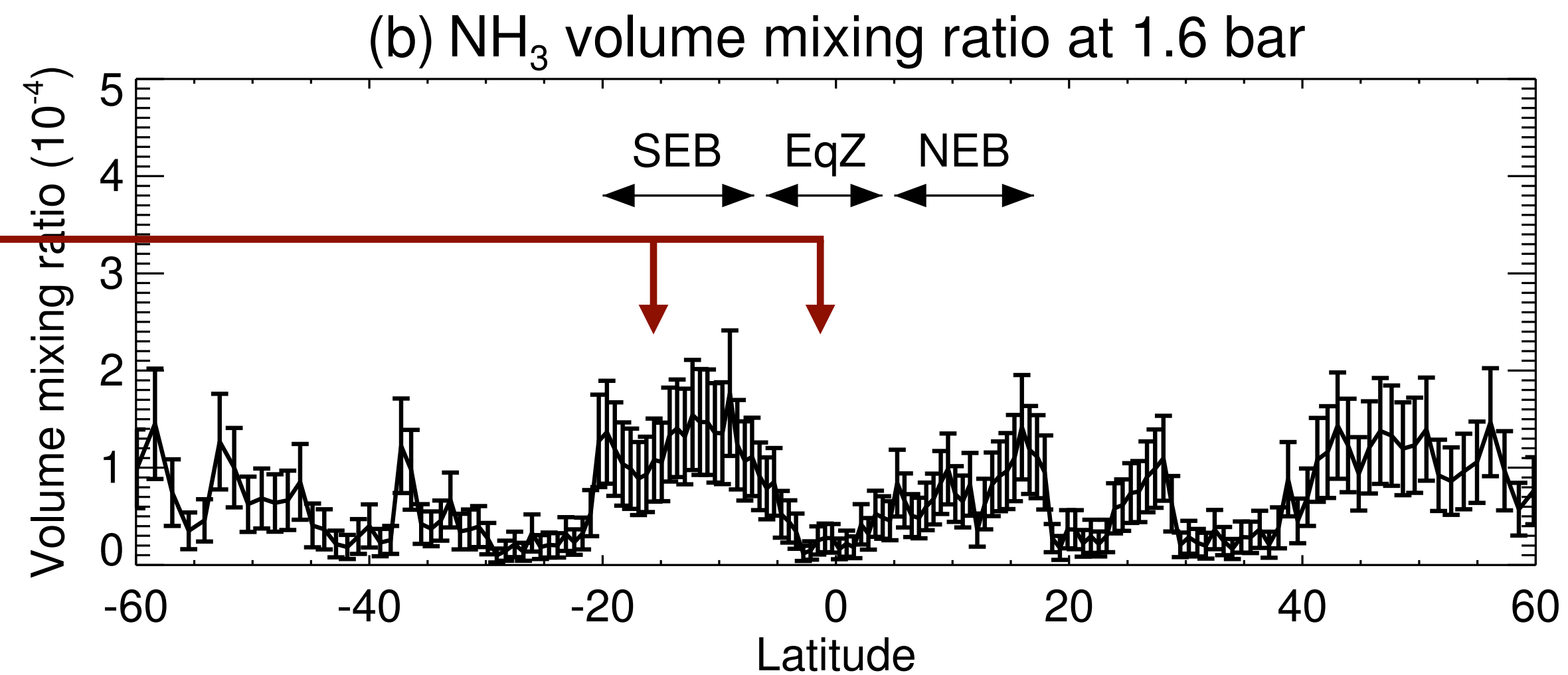
- NEMESIS retrieval algorithm (Irwin et al., 2008) used to fit spectrum
- NH_3 allowed to vary continuously, model assumes single cloud layer at 0.8 bar



Latitudinal retrieval

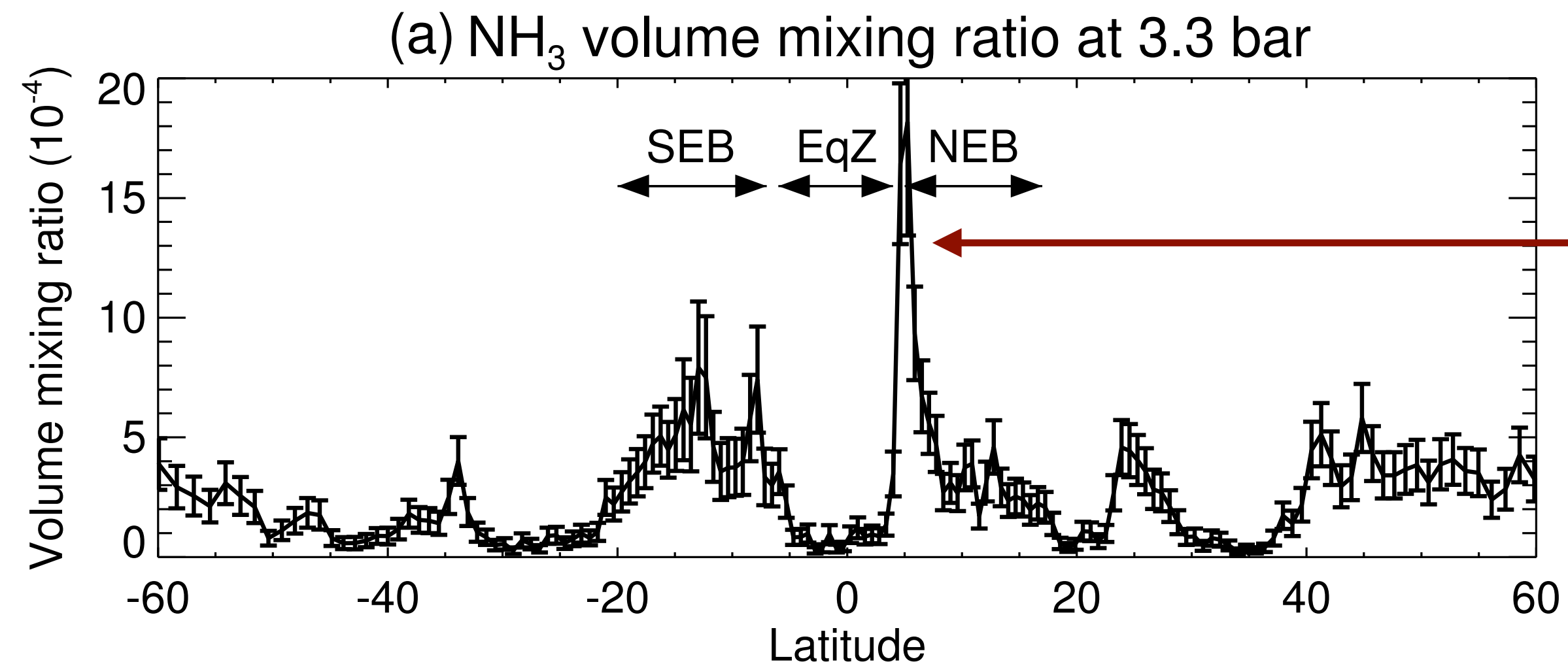


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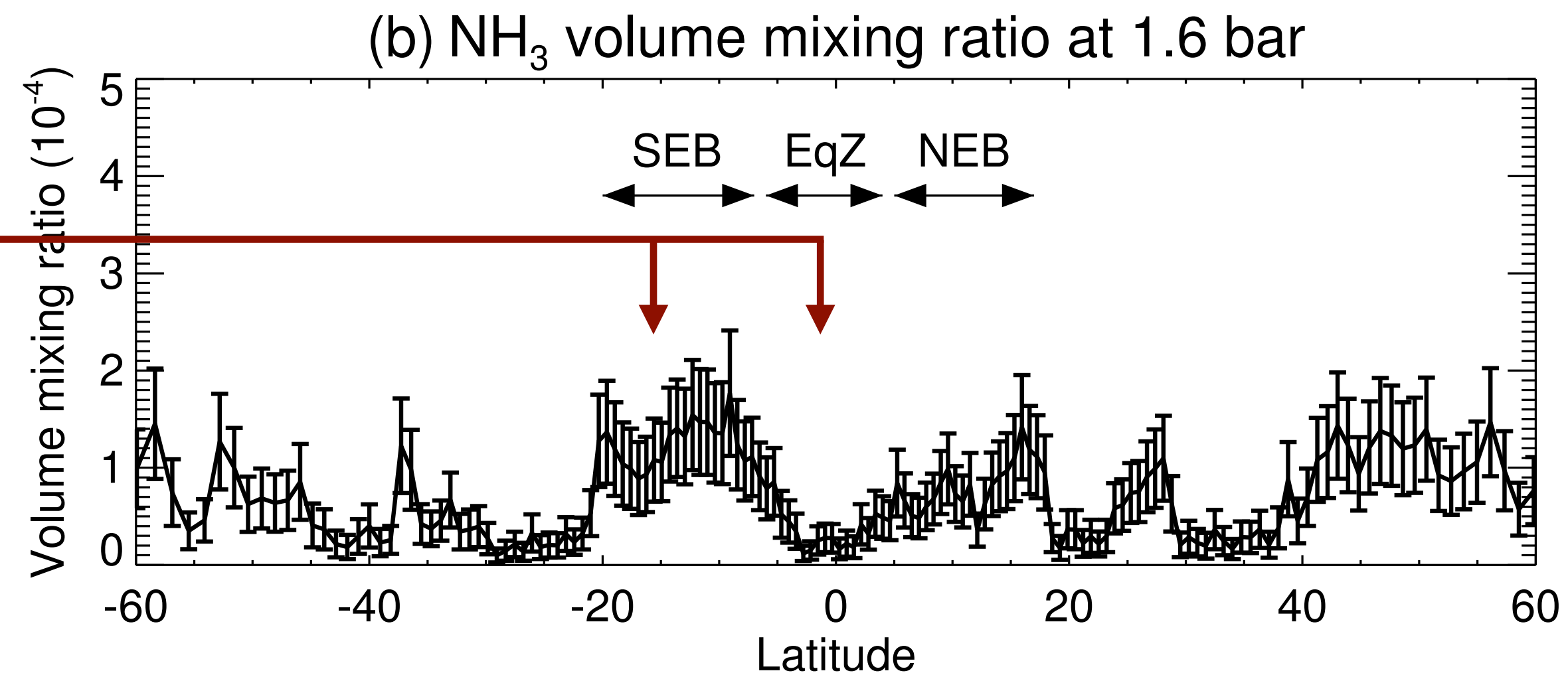
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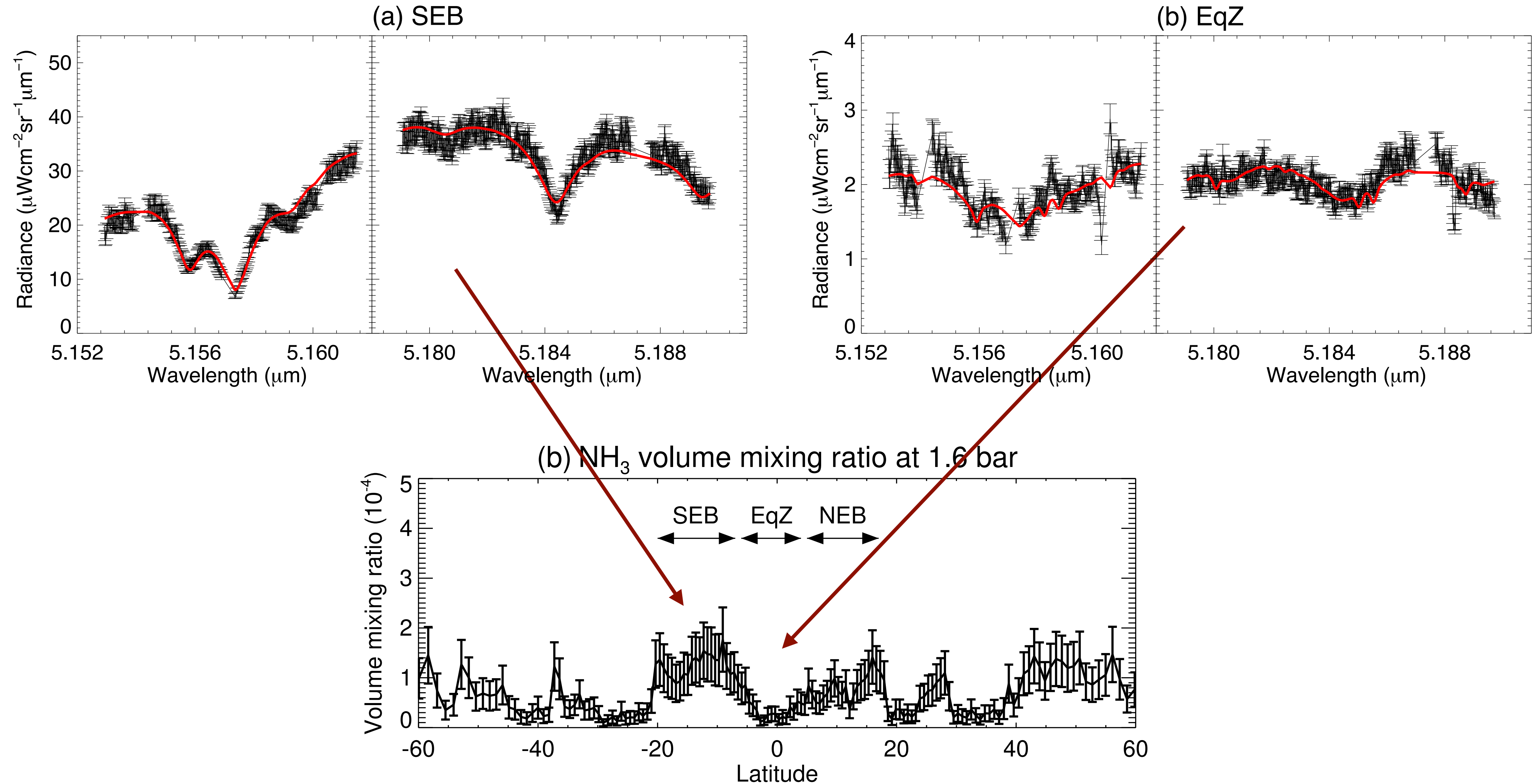


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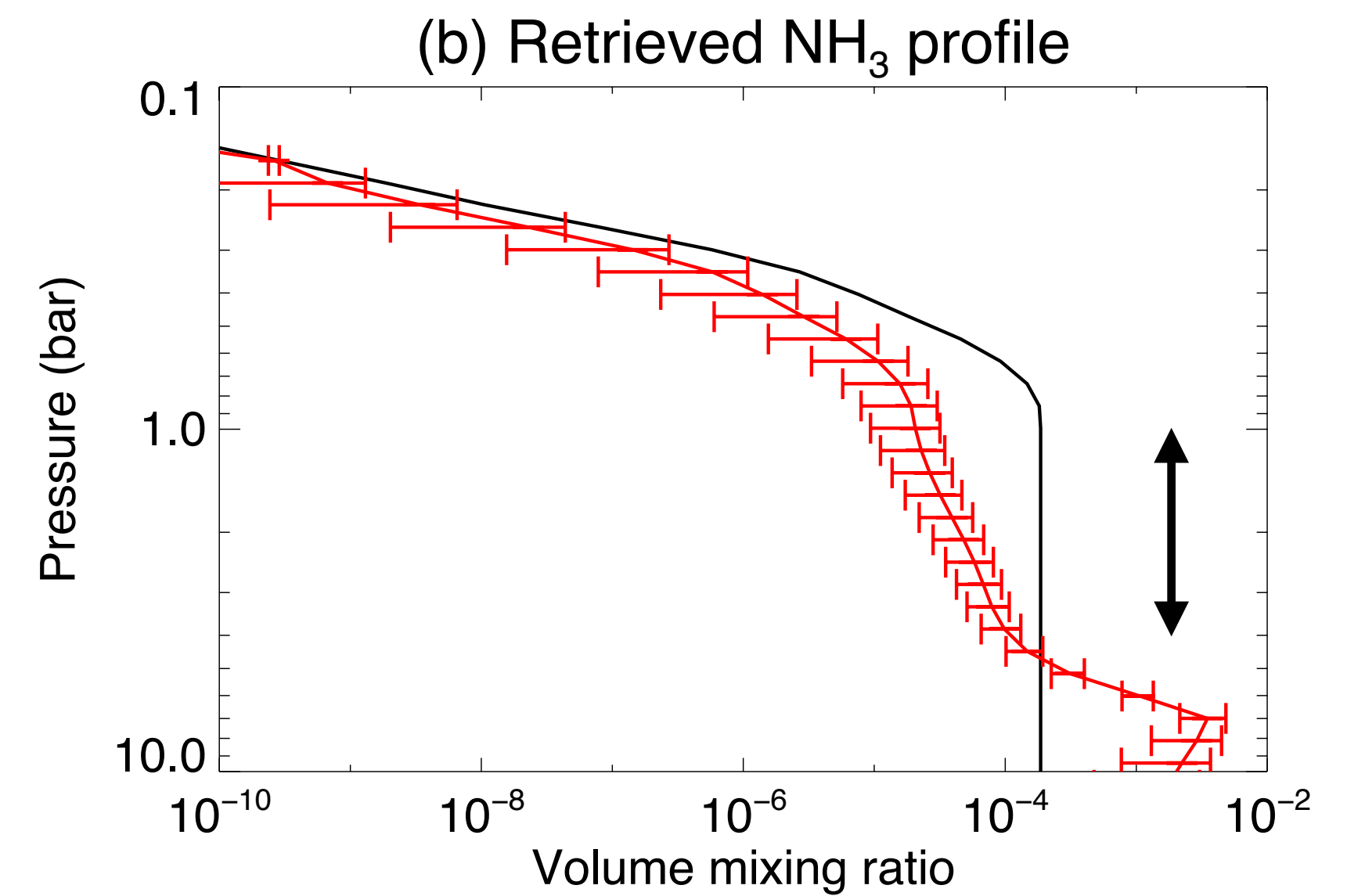
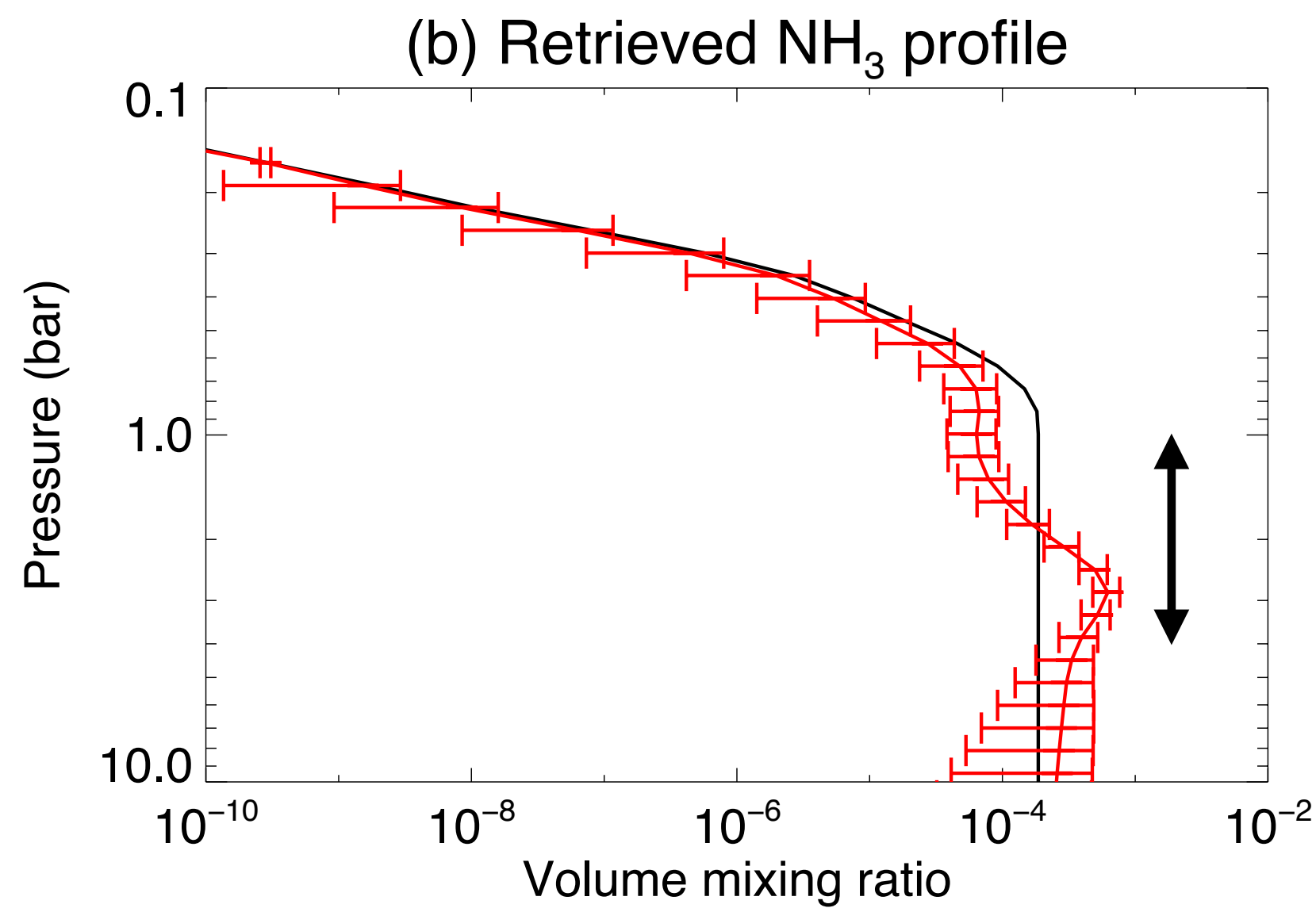
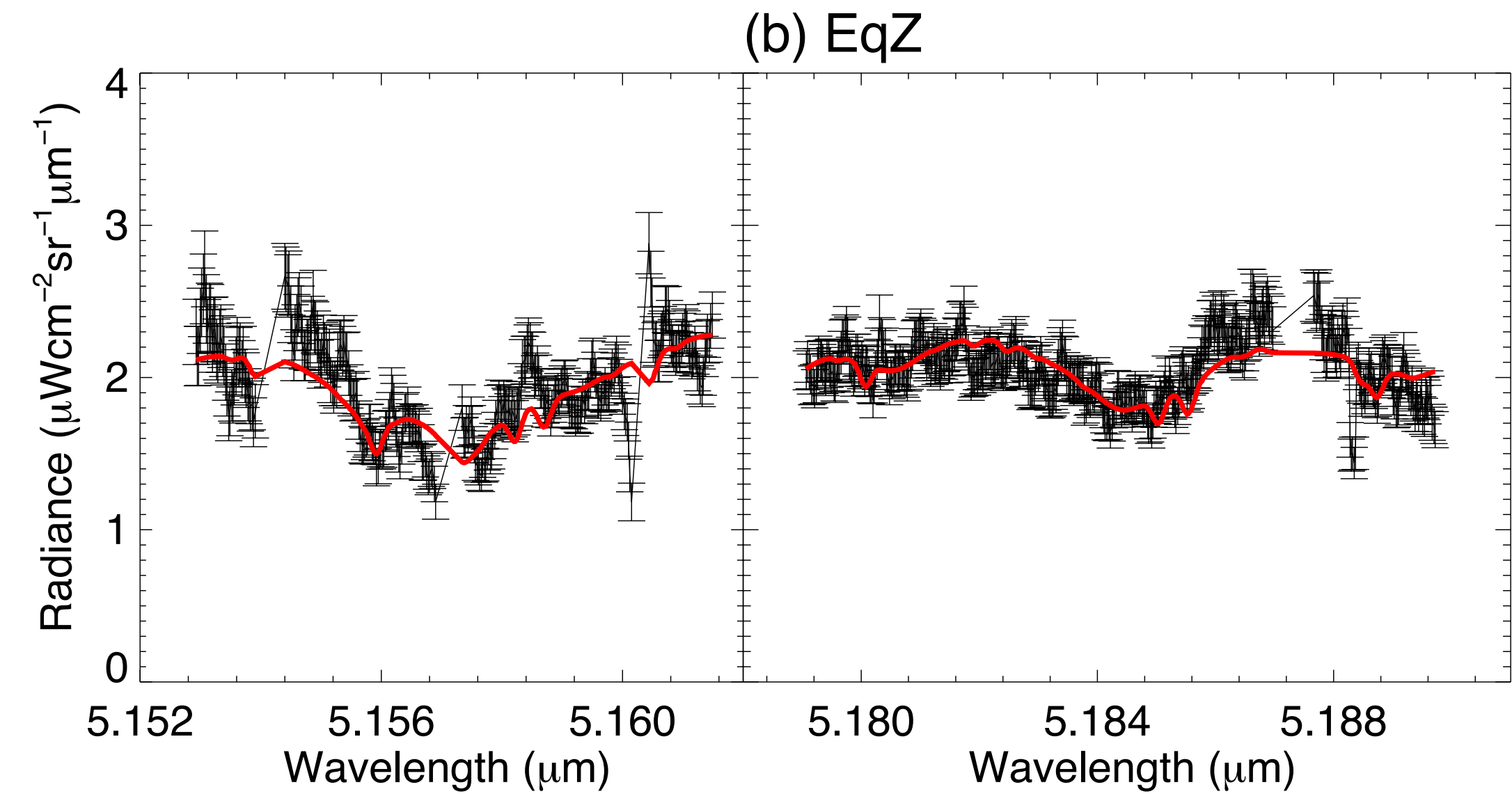
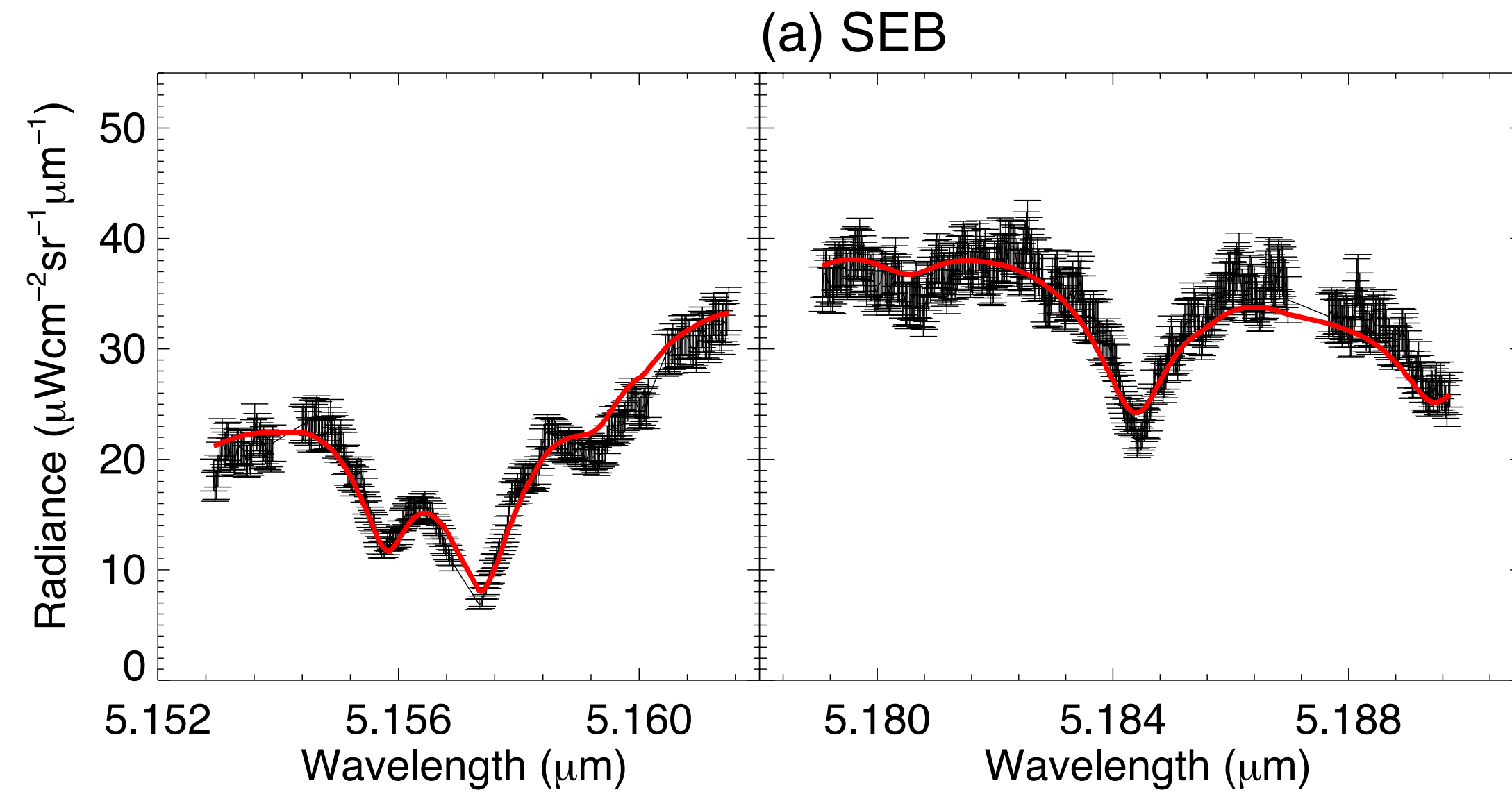
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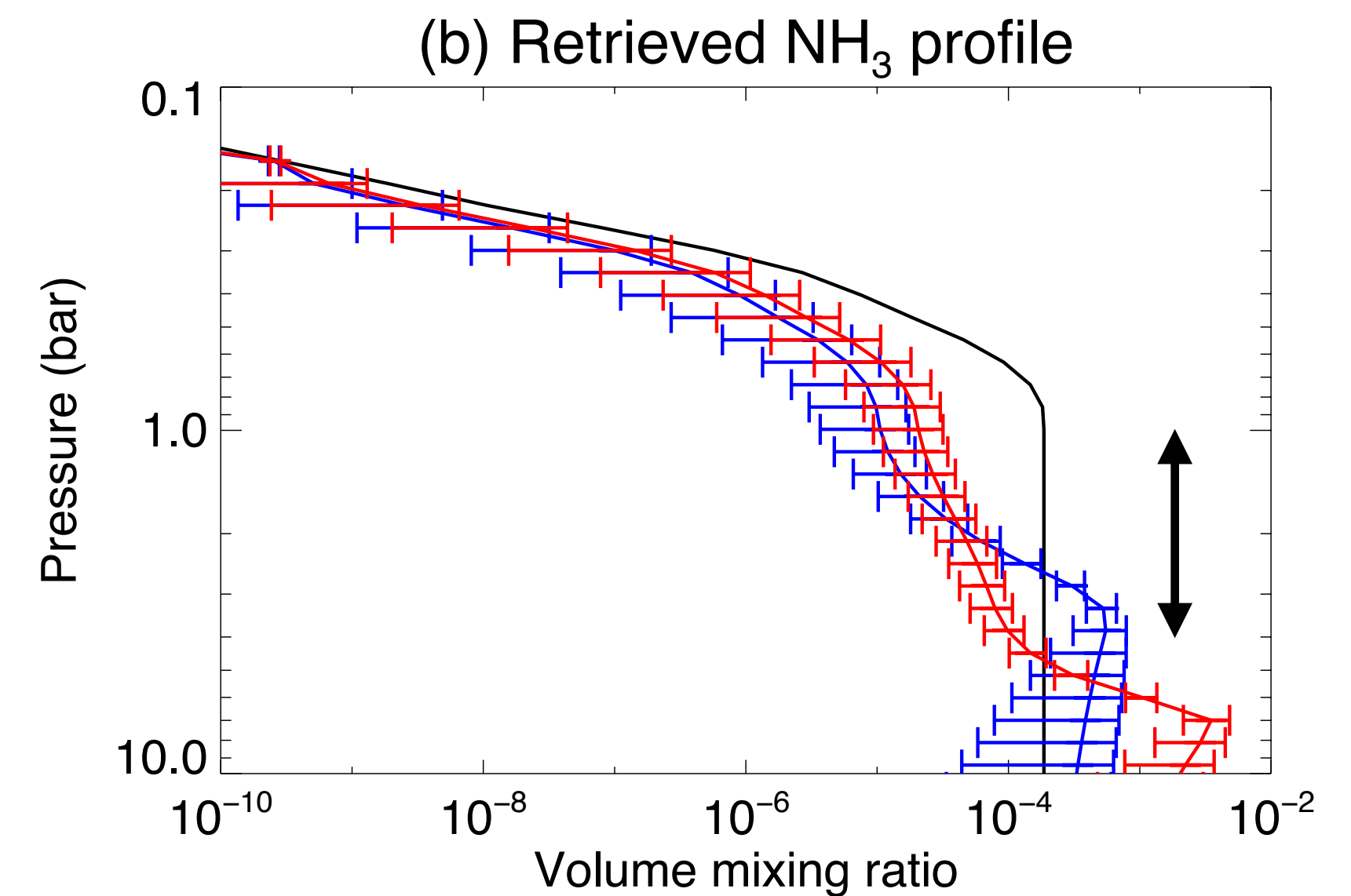
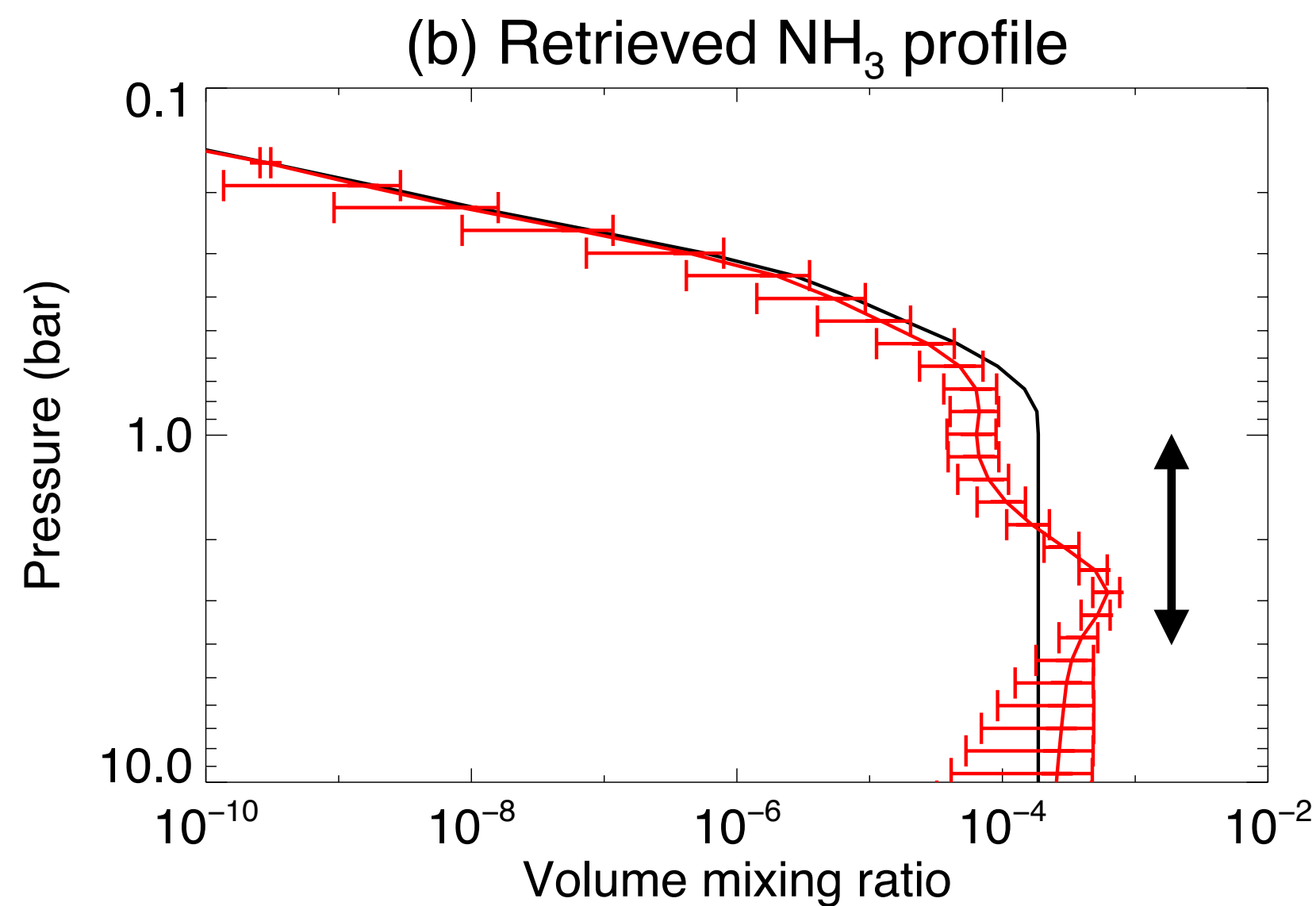
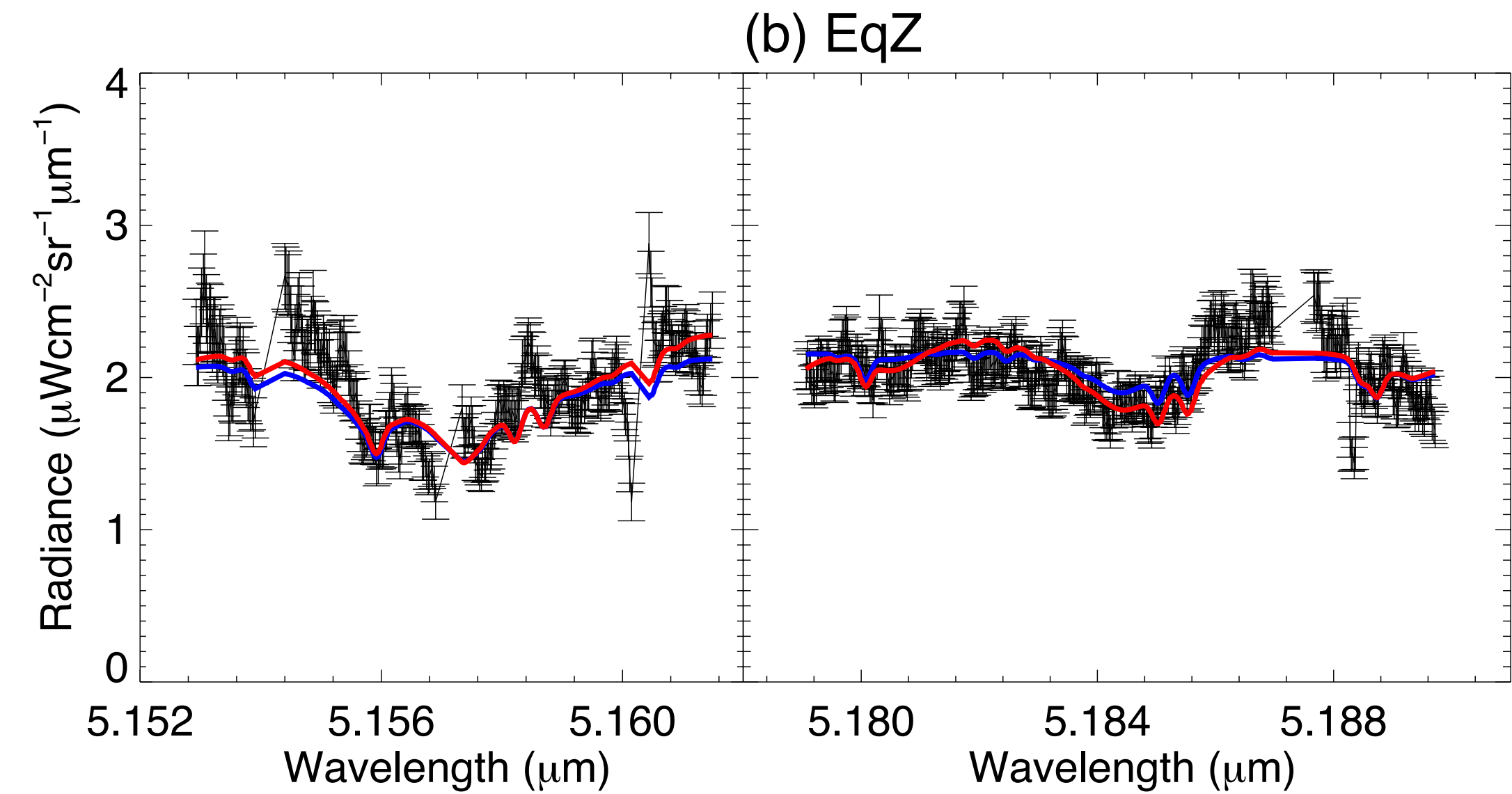
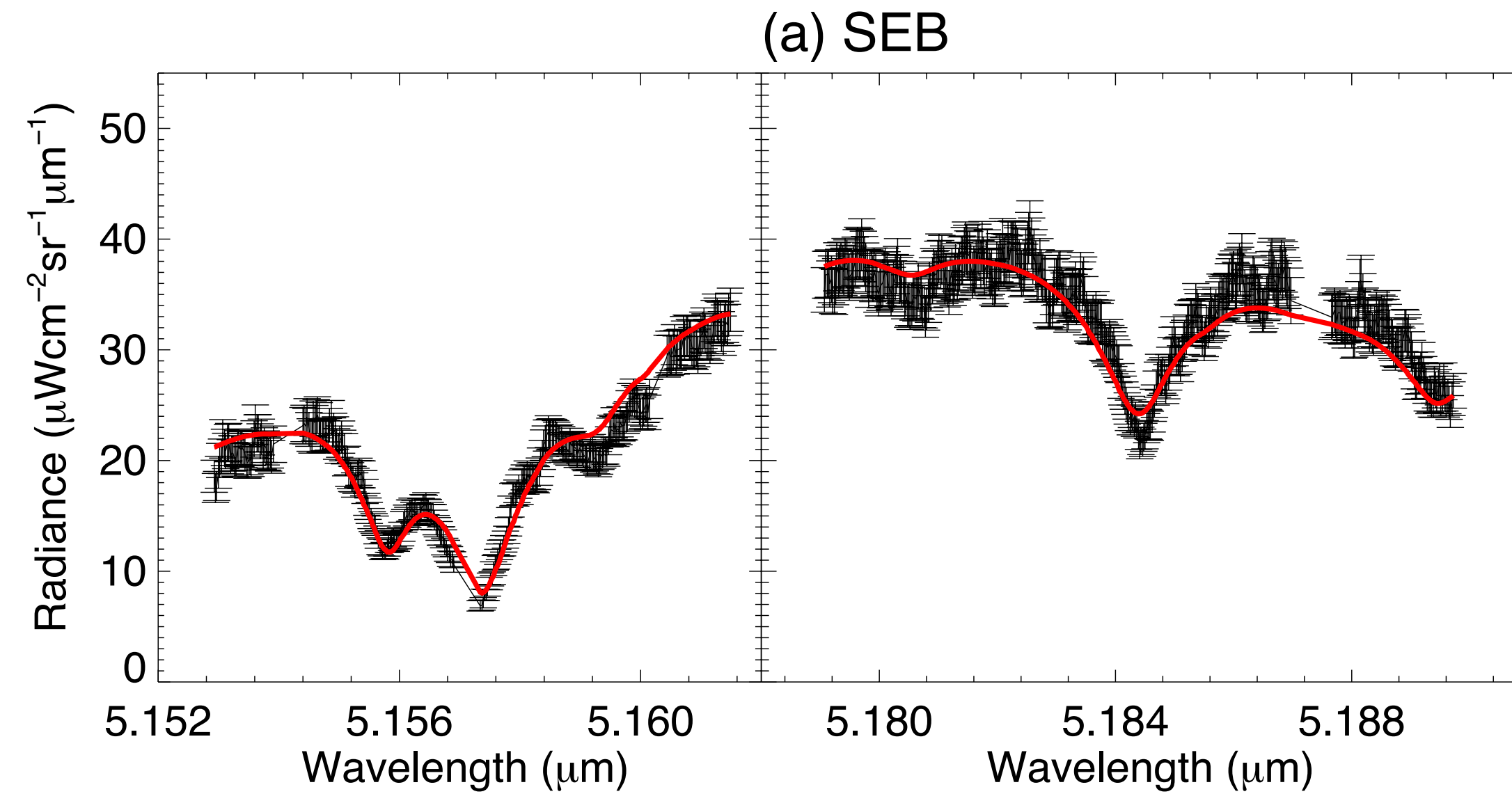
Any evidence for belt-zone variability?



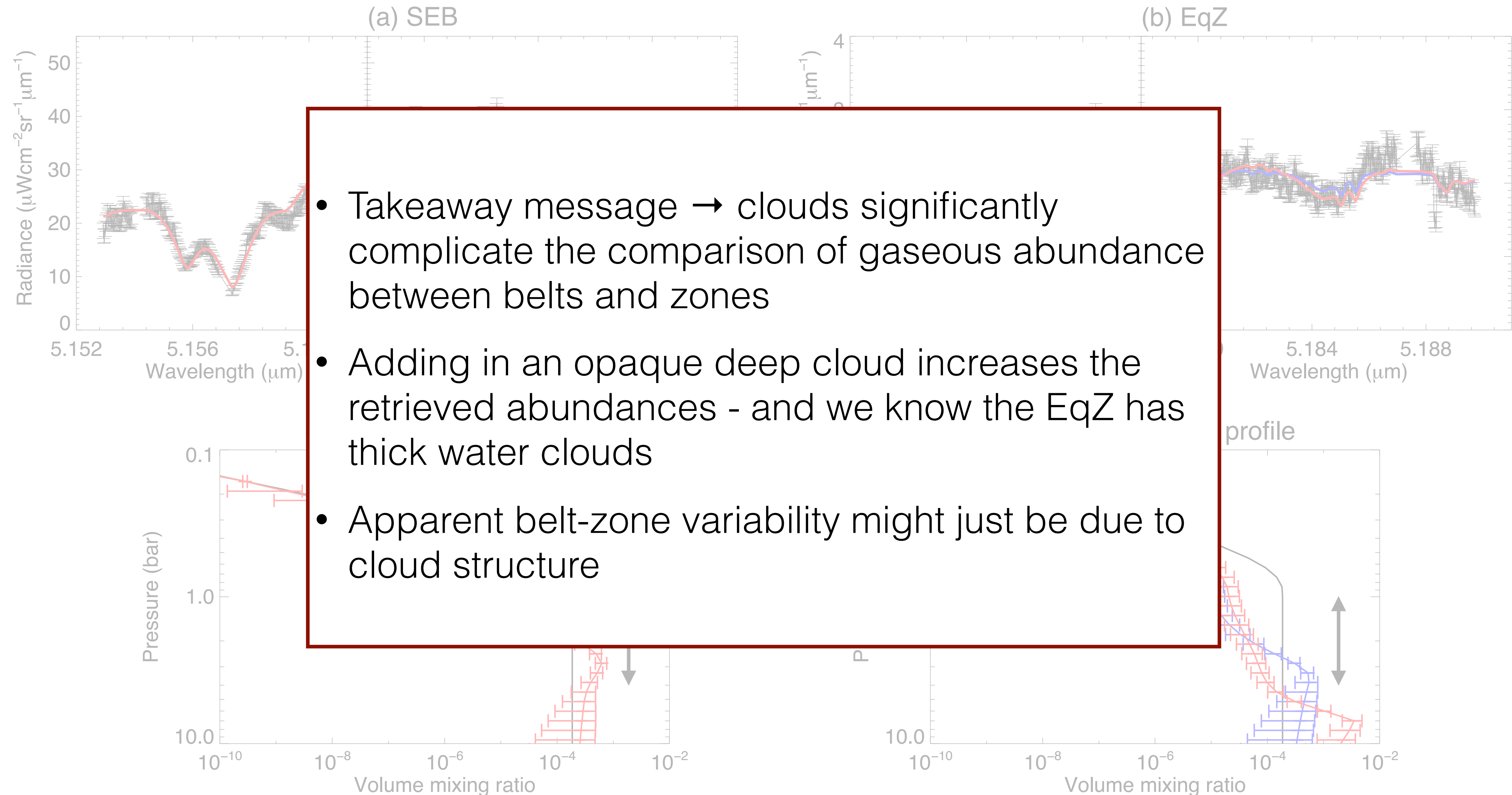
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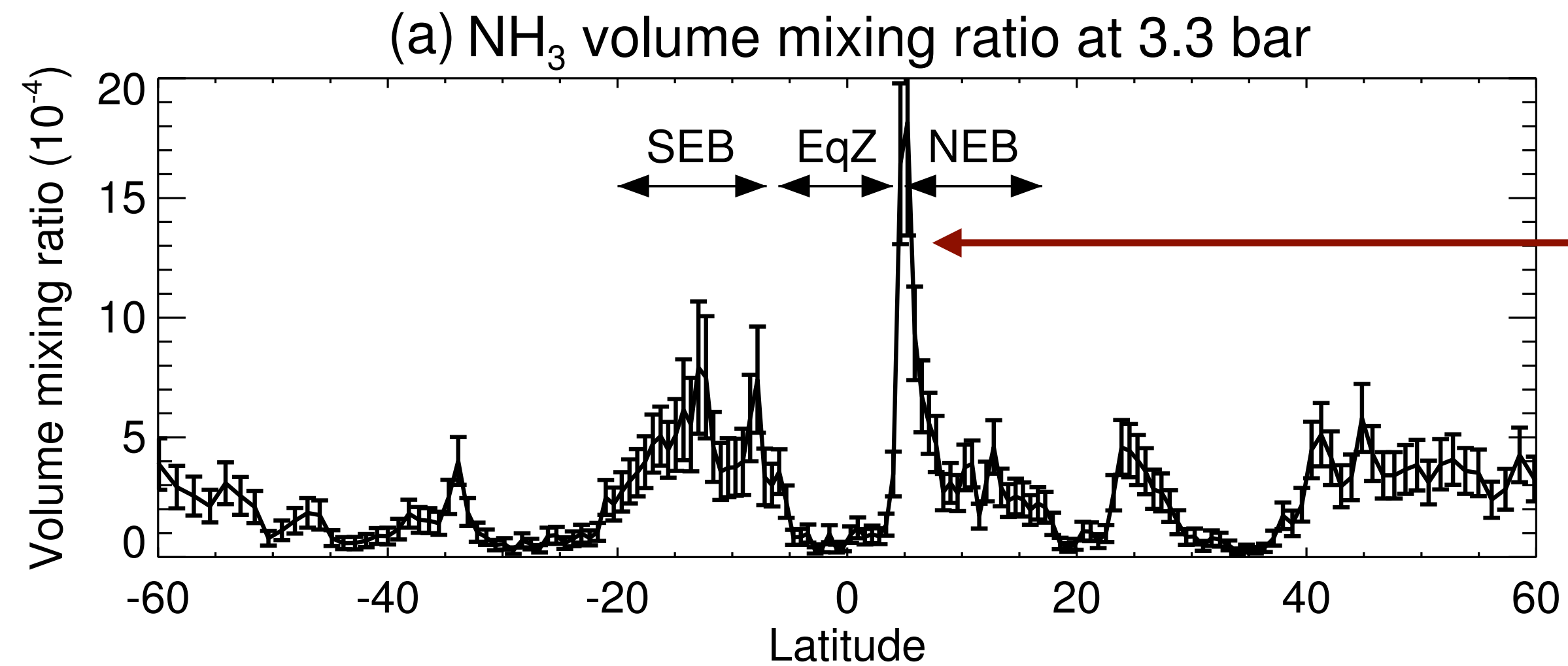
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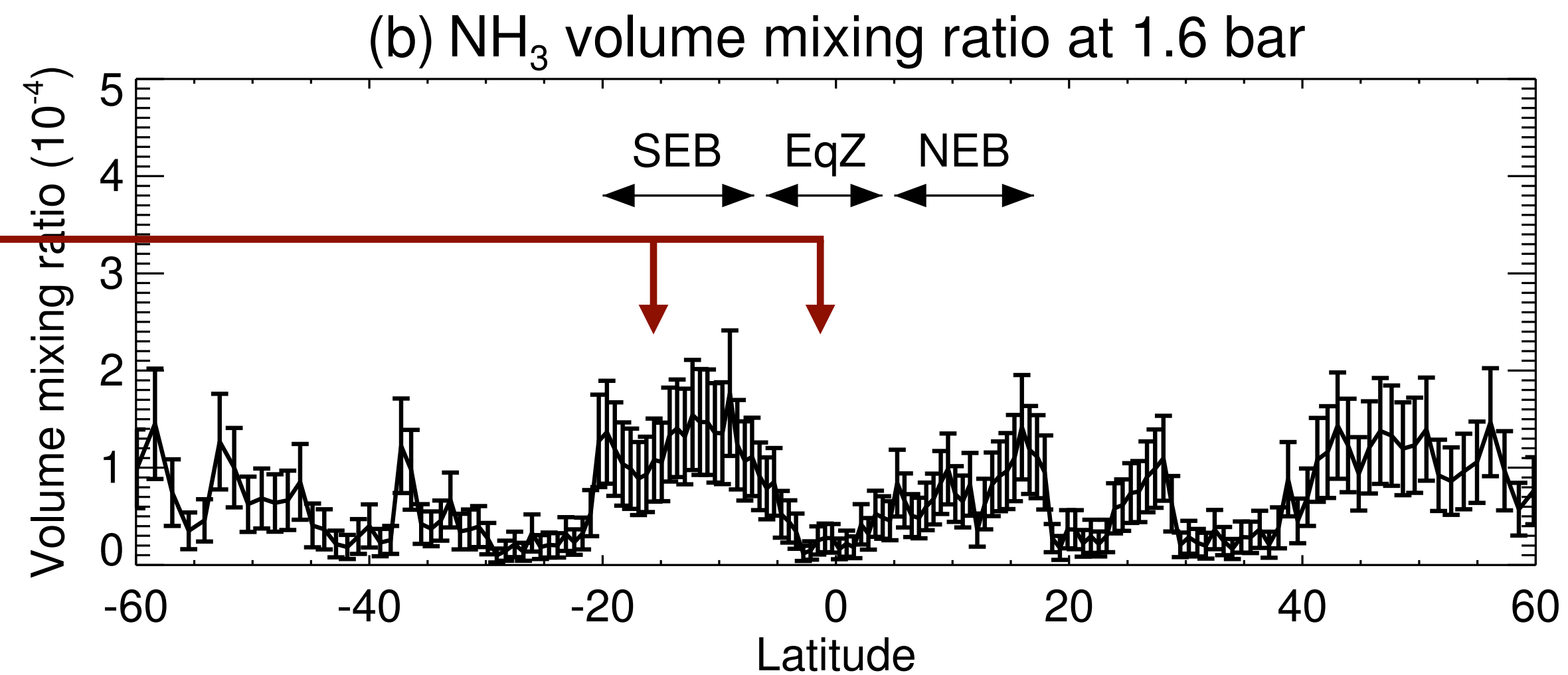
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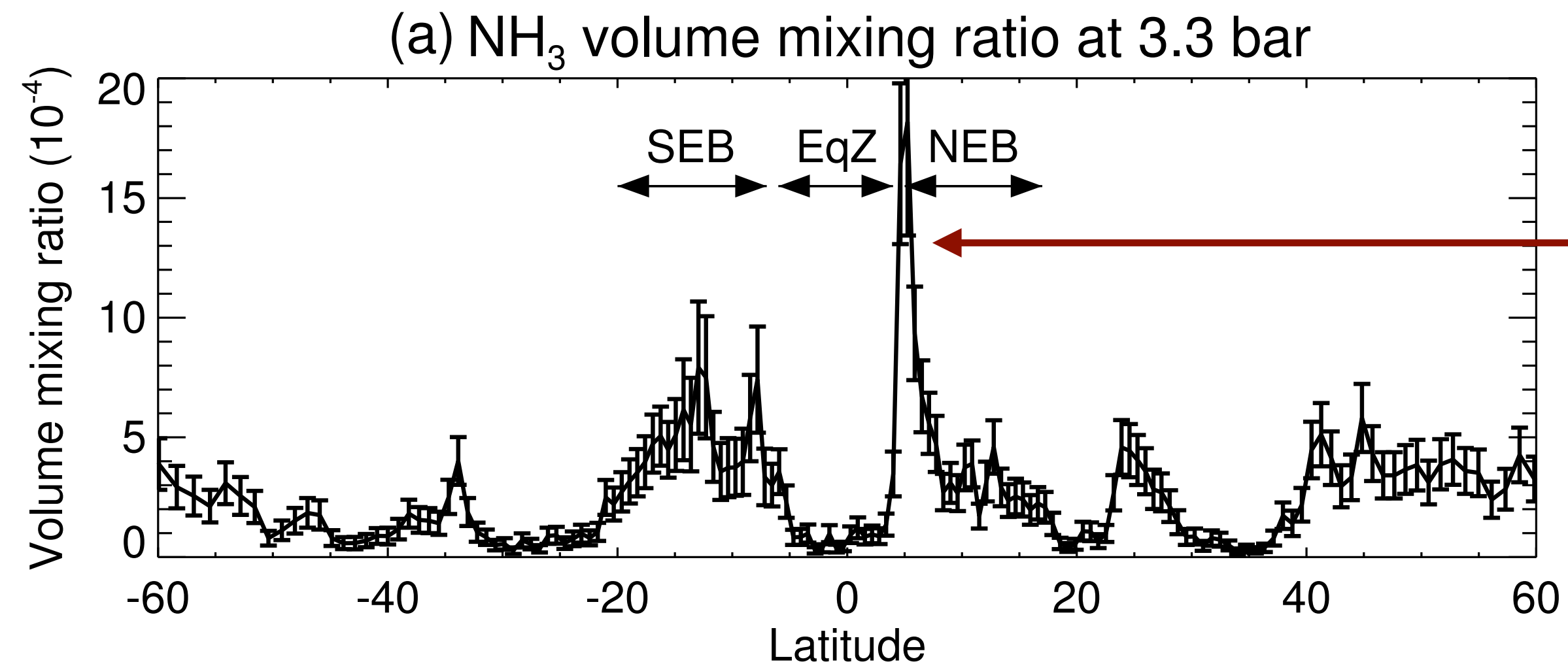


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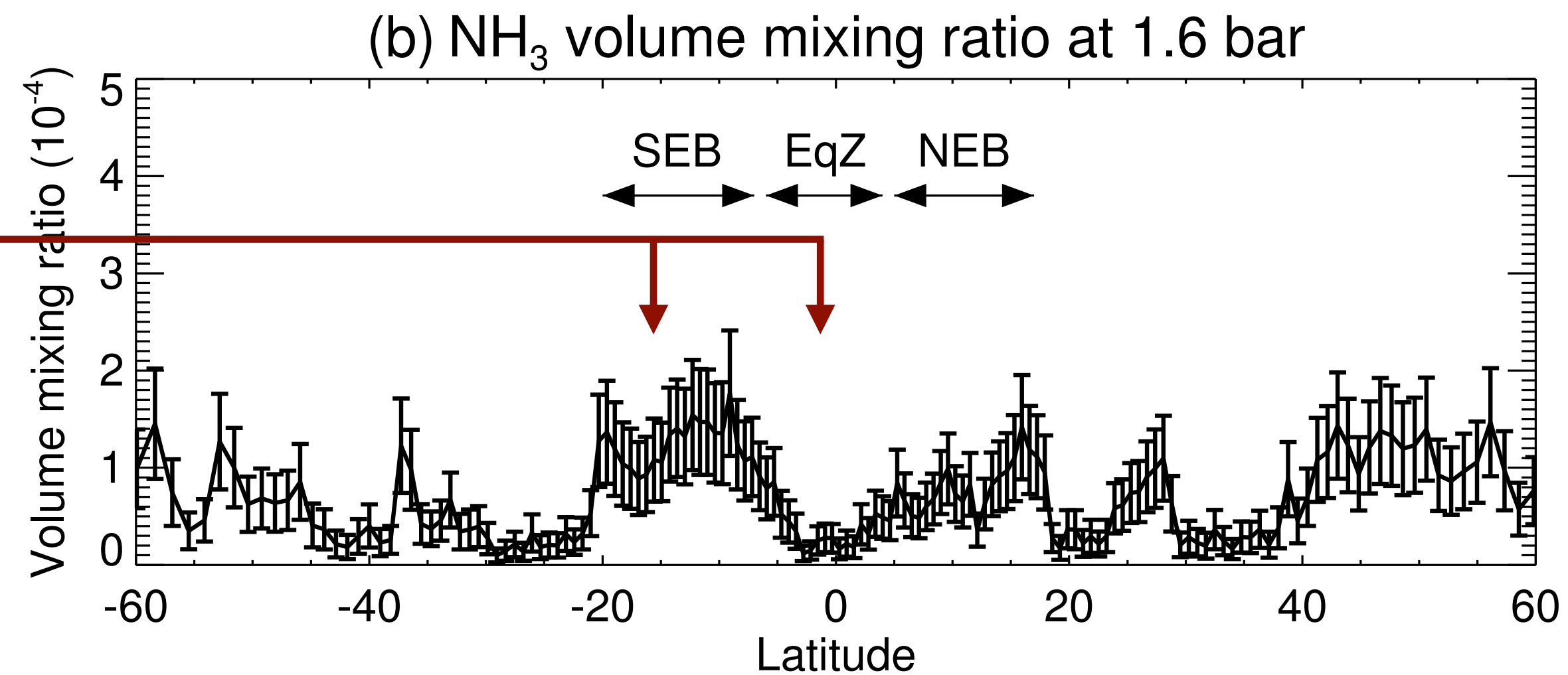


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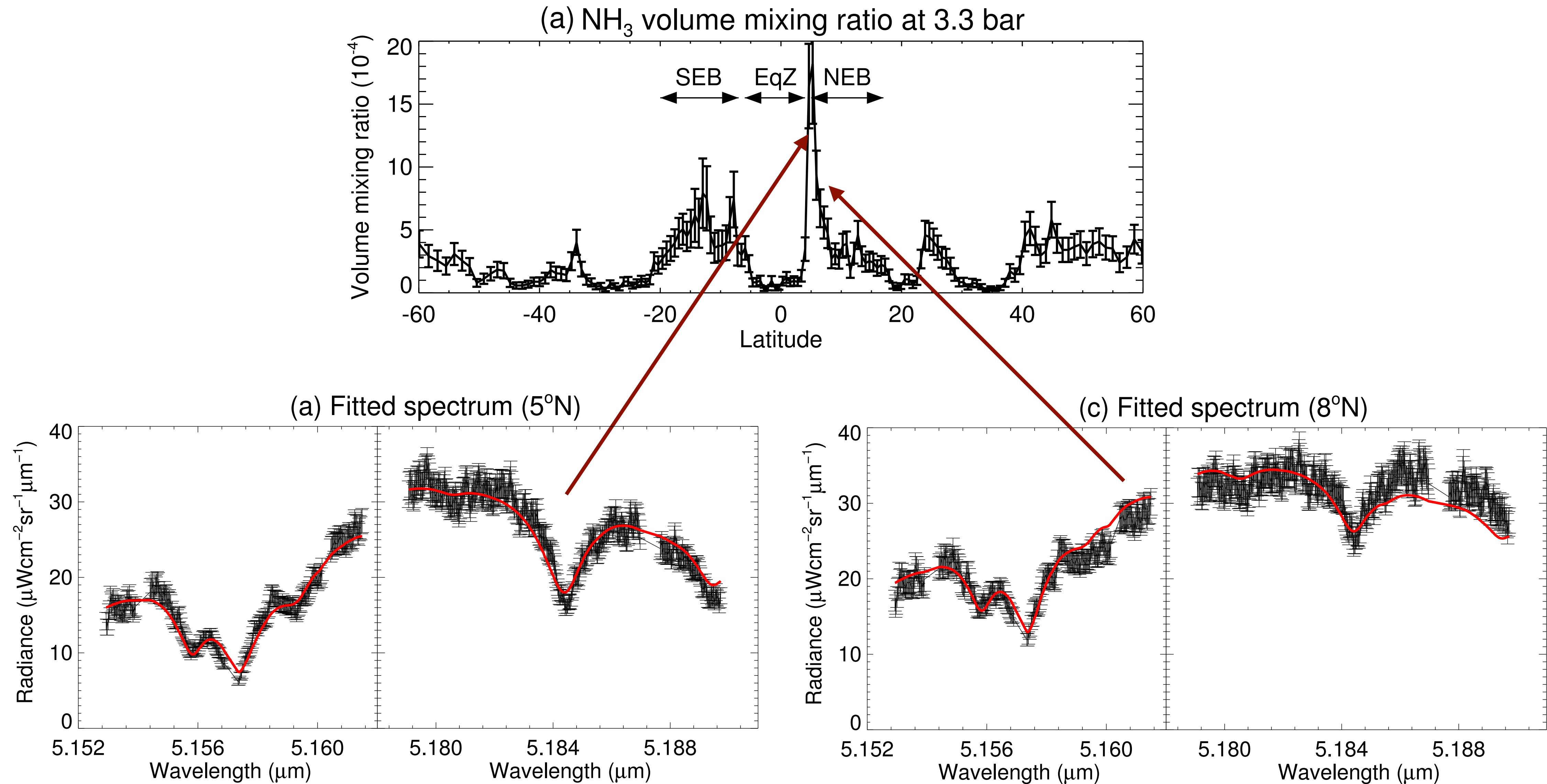


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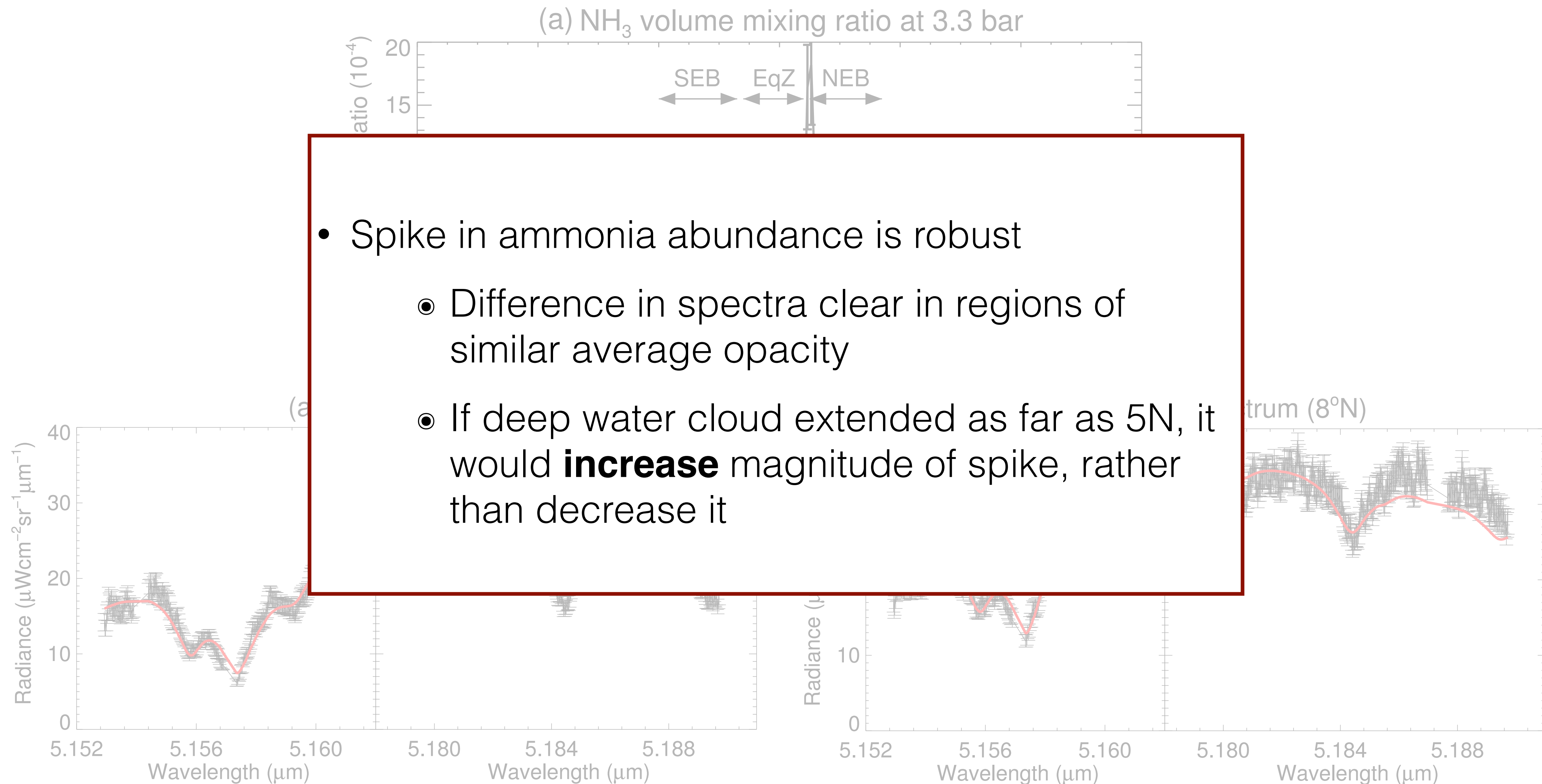


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- NH_3 line shape varies between belts and zones → assuming a single 0.8-bar cloud deck, retrieved abundances are higher in belts than zones
 - However, the presence of a deep water cloud complicates analysis, and can increase retrieved abundances in zones
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Giles et al,
accepted in
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